Vario focus option
with
Optimus RAD - R/F - C generators

Vario focus is a virtual focus as an electronic mix of large and small focus.

Vario focus is only possible with tubes having super-imposed focal spots.

Four tube types are available for the use of the Vario focus option:

RO17/50 SRO09/51 SRO25/50 SRO33/100

A Vario focus selection is not possible for all other tube types.

With the Vario focus option

- one can select between 7 different power “ranges” or max possible emission currents

and with it

- the resulting focal spot sizes:

100 % large focus

20 % of max small focus emission current + additional current from large
35 % ditto
50 % ditto
65 % ditto
80 % ditto

100 % small focus.

The calculation for the ratios 20...80% of small focus takes the kV dependent

$$\frac{\text{max emission current}}{\text{common area of focal spots}} = \text{current density}$$

on the anode disk surface into account.

The 100% emission current (power) values of small and large focus represent the max emission current / focal spot area.

The calculation of the small emission current is easy.
It is the kV dependent max mA value multiplied with the %-factor (35% = 0.35 x mA[max]).

The additional large focus emission current is calculated in that way that the total mA (current density) on the common area of the small focal spot (on which small and large meet) is never increased.

During exposure:
The small focus filament current (and also its emission current) remain stable.
If there are deviations in the mA value the large focus filament current is controlled. It has a larger control range compared to the small focus which makes control much faster.
Mainly the large focus control is also used for the falling load techniques, only with long exposures the small filament current is also reduced if necessary.

The use of the Vario focus has some advantages:

- One gets always the best resolution (especially at systems allowing magnification) depending on the Vario focus ratio and with it its focal spot size.
  Sometimes there are local restrictions regarding max exposure times. Then one can calculate the best Vario focus ratio with respect to the exposure time with the help of the APRMAN program. If the installed tube type is programmed APRMAN helps when the calculator options are used.

- If any of the 20...80% ratio is selected the filament current is always lower compared to the 100% small or large focus selection.
  This, especially at children's and A&E rooms with low kV stages and long preparation times, helps increasing the filament life time.

APR must properly be prepared as for the ratio selection. The customer can select the Vario focus button, but the ratio which has been set for each APR cannot be changed on the control desk.

The max mA value depending on the generator version must also be taken into account (50kW = 650mA, 65kW = 900mA, 80kW = 1100mA).

None of the possible power or emission currents reductions should be programmed.
It will lead to very strange secondary symptoms, e.g. long exposure times or premature exposure terminations from the "Fault exposure detection" supervision (see chapter FAULT FINDING of the generator manual).